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BEFORE THE BOARD OF PATENT APPEALS
AND INTERFERENCES

Ex parte ARUN KAWNGIL IYENGAR, RICHARD P. KING, GABRIEL GARCIA MONTERO, DANIELA ROSU, and KAREN WITTING

Appeal 2009-006544
Application 10/715,225[1]
Technology Center 2100

Decided: December 30, 2009

Before LEE E. BARRETT, JAY P. LUCAS, and THU A. DANG, *Administrative Patent Judges.*

LUCAS, *Administrative Patent Judge.*

DECISION ON APPEAL

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[1] Application filed November 17, 2003. The real party in interest is International Business Machines, Inc.

STATEMENT OF THE CASE

Appellants appeal from a final rejection of claims 1-26 under authority of 35 U.S.C. § 134(a). The Board of Patent Appeals and Interferences (BPAI) has jurisdiction under 35 U.S.C. § 6(b).

Appellants' invention relates to a method of managing cache consistency so that overhead (use of network resources) is reduced (Spec. 1, ll. 7-9; 2, l. 20; 6, ll. 18-20). In the words of Appellants:

> When multiple copies of an object [*i.e.*, data] exist within a system, a key problem is how to ensure that, upon object updates, clients reading the various copies obtain "consistent" content.

(Spec. 7, ll. 2-5).

Claim 1 is exemplary:

> 1. In a system comprised of a plurality of storage elements, a method for maintaining objects in the storage elements comprising the steps of:
>
> maintaining information regarding which storage elements are storing particular objects in a consistency coordinator which communicates with the storage elements;
>
> responding to a request to update an object by using maintained information to determine which of the storage elements may store a copy of the object;
>
> instructing the storage elements, which the consistency coordinator suspects store a copy of

the object, to invalidate their copy of the object; and

delaying an updating of the object until it is determined that each storage element instructed to invalidate a copy of the object has either (i) acknowledged that it is not storing a valid copy of the object or (ii) been deemed unresponsive.

The prior art relied upon by the Examiner in rejecting the claims on appeal is:

Hiraoka	US 4,733,348	Mar. 22, 1998
Iyengar	US 2003/0172236 A1	Sep. 11, 2003
Chang	US 2005/0128960 A1	Jun. 16, 2005

REJECTIONS

The Examiner rejects the claims as follows:

R1: Claims 1-6, 10-12, 16-24, and 26 stand rejected under 35 U.S.C. § 103(a) for being obvious over Iyengar in view of Hiraoka.

R2: Claims 7-9, 14-15, and 25 stand rejected under 35 U.S.C. § 103(a) for being obvious over Iyengar in view of Hiraoka and further in view of Chang.

Groups of Claims:

Claim 1 is representative. *See* 37 C.F.R. § 41.37 (c) (vii). *See also In re McDaniel*, 293 F.3d 1379, 1383 (Fed. Cir. 2002) ("If the brief fails to meet either requirement [of 37 C.F.R. § 1.192(c)(7)], the Board is free to select a single claim from each group of claims subject to a common ground of rejection as representative of all claims in that group and to decide the appeal of that rejection based solely on the selected representative claim.").

Appellants contend that the claimed subject matter is not rendered obvious by Iyengar alone, or in combination with Hiraoka and/or Chang, because Iyengar fails to disclose or suggest "delaying the updating of the object until it is determined that each storage element instructed to invalidate a copy of the object has either (i) acknowledged that it is not storing a valid copy of the object or (ii) been deemed unresponsive," as recited in exemplary claim 1. (*See* Brief 8, top.) The Examiner contends that each of the claims is properly rejected (Ans. 15, middle).

Rather than repeat the arguments of Appellants or the Examiner, we make reference to the Brief and the Answer for their respective details. Only those arguments actually made by Appellants have been considered in this opinion. Arguments that Appellants could have made but chose not to make in the Brief have not been considered and are deemed to be waived.

We affirm the rejections.

ISSUE

The issue is whether Appellants have shown that the Examiner erred in rejecting the claims under 35 U.S.C. § 103(a). The issue turns on whether the claim language "(i) acknowledged that it is not storing a valid copy of the object or (ii) been deemed unresponsive" (claim 1) requires that both limitations (i) and (ii) be met by the Iyengar reference. A second issue turns on whether Iyengar discloses limitation (i) (claim 1).

FINDINGS OF FACT

The record supports the following findings of fact (FF) by a preponderance of the evidence.

Disclosure

1. Appellants have invented a method, device, and system of maintaining cache consistency using a cache coordinator that updates objects stored in the storage elements. (*See* claim 1.) The method includes delaying object updates such that storage elements do not contain invalid object copies (*id.*). Optionally, the method may delay object updates until storage elements are deemed unresponsive. (*See* Ans. 16, top to middle; claim 1.)

Iyengar

2. The Iyengar reference discloses maintaining cache consistency using a central cache that updates data stored in the local caches. (*See* ¶ [0026].) Iyengar discloses coordinating data updates such that local caches do not contain invalid data. (*See* ¶ [0040].)

Hiraoka

3. The Hiraoka reference discloses sending an acknowledgment signal when a memory processor (element 20_3, *see* col. 4, l. 48) controlling a buffer (translation lookaside buffer, TLB, *see* col. 1, ll. 10-11; col. 4, l. 49) is deemed unresponsive. (*See* col. 4, ll. 42-50; Ans. 8, middle.) Hiraoka further discloses acknowledging responsive memory processors (elements 20_0, 20_1, and 20_2). (*See* col. 4, ll. 49-50; Ans. 8, middle.)

Chang

4. The Chang reference discloses using "heart beat" messages to identify faulty components as soon as possible. (*See* ¶ [0017]; Ans. 12, bottom to 13, top.)

PRINCIPLES OF LAW

Appellants have the burden on appeal to the Board to demonstrate error in the Examiner's position. *See In re Kahn*, 441 F.3d 977, 985-86 (Fed. Cir. 2006) ("On appeal to the Board, an applicant can overcome a rejection [under § 103] by showing insufficient evidence of prima facie obviousness or by rebutting the prima facie case with evidence of secondary indicia of nonobviousness.") (quoting *In re Rouffet*, 149 F.3d 1350, 1355 (Fed. Cir. 1998)).

Our reviewing court states in *In re Zletz*, 893 F.2d 319, 321 (Fed. Cir. 1989) that "claims must be interpreted as broadly as their terms reasonably allow." Our reviewing court further states that "the words of a claim 'are generally given their ordinary and customary meaning.'" *Phillips v. AWH Corp.*, 415 F.3d 1303, 1312 (Fed. Cir. 2005) (en banc) (internal citations omitted).

ANALYSIS

From our review of the administrative record, we find that the Examiner has presented the rejections of Appellants' claims under 35 U.S.C. § 103(a) on pages 3 to 13 of the Examiner's Answer. In opposition, Appellants present one main argument.

Argument with respect to the rejection of claims 1 to 6, 10 to 12, 16 to 24, and 26 under 35 U.S.C. § 103(a) [R1]

We address Appellants' argument that "claim 1 includes features that are not disclosed or suggested by Iyengar and Hiraoka, either singularly or in combination." (Brief 13, top) (Appellants' emphasis omitted).

In reply, the Examiner points out in the Answer that claim 1 only requires that one of two limitations (*i.e.*, (i) or (ii)) be met. That is, the exemplary claim only requires "delaying an updating of the object until it is determined that each storage element instructed to invalidate a copy of the object has" "(i) acknowledged that it is not storing a valid copy of the object," and not that the claimed "delaying" step include both "(i) acknowledged that it is not storing a valid copy of the object" and "(ii) been deemed unresponsive," as argued above by Appellants.

First, we decide whether claim 1 requires both of the limitations, or only one of the two limitations. We adopt the Examiner's finding that the claim language is recited in the alternative (*see* FF#1). Our reviewing court holds that "words of a claim 'are generally given their ordinary and customary meaning.'" *Phillips*, 415 F.3d at 1312. We read the exemplary claim as requiring only one of the two claim limitations, *i.e.*, Appellants' claimed "(i) acknowledged that it is not storing a valid copy of the object" or "(ii) been deemed unresponsive" (claim 1) because the claim recites "either"/ "or" language, the plain meaning of which renders limitation (i) or limitation (ii) optional. (*See* FF#1.)

Next, since the Examiner cites Iyengar for disclosing the first limitation (i) (*see* Ans. 6, middle), we review the Examiner's findings

regarding Iyengar's disclosure. We find that Appellants have invented a method, device, and system of maintaining cache consistency using a cache coordinator that updates objects stored in the storage elements (FF#1). The method includes delaying object updates such that storage elements do not contain invalid object copies (*id.*). In comparison, the Iyengar reference discloses maintaining cache consistency using a central cache that updates data stored in the local caches (FF#2). Iyengar discloses coordinating data updates such that local caches do not contain invalid data (*id.*).

We find that a person of ordinary skill in the art would have understood Iyengar's disclosure describing how local directories operate (*see* ¶¶ [0030], [0040]) on the central cache as being the same as Appellants' claimed "consistency coordinator" that "communicates with the storage elements" and performs "updating of the object" (claim 1). The skilled artisan would have recognized Iyengar's data as being the same as Appellants' claimed "object" and Iyengar's "local caches" that store data as being the same as the claimed "storage elements." We note that the Specification discloses that an "object" includes "any form of data" (Spec. 5, l. 22). Reading the claim language broadly but reasonably, *see In re Zletz*, 893 F.2d at 321, we construe the claimed "delaying" step of claim 1 to mean coordinating the claimed "object" (*i.e.*, data) in the claimed "storage elements" so that no invalid "object copy" is stored in the "storage elements."

Further, we find that Iyengar's coordinating of local caches so that they do not contain stale data inherently includes a first step of receiving a signal from each local cache with stale data before (*i.e.*, prior to) the second step, whereby the central cache sends current data to those local caches that

contain stale data. (*See* ¶¶ [0006], [0030], and [0040].) This inherent feature is performed by the local directories (element 110) of Iyengar's central cache. (*Id.*). We find that Iyengar's inherent feature is sufficient to render obvious Appellants' claim limitation "delaying an updating of the object until it is determined that each storage element instructed to invalidate a copy of the object has … (i) acknowledged that it is not storing a valid copy of the object." Accordingly, we find no error in the Examiner's analysis of claim 1.

We note that the findings (*see* FF#3) regarding the Hiraoka reference reinforce the findings (*see* FF#2) in Iyengar. In view of the alternative claim language recited in claim 1 (*see* FF#1) and since Iyengar's disclosure alone meets the required (as opposed to the optional) language of claim 1, we find unpersuasive Appellants' arguments regarding the Hiraoka reference. (*See* Brief 10, middle; 11, bottom; 12, middle). Accordingly, we find no error regarding the Examiner's analysis of claim 1.

Although Appellants argue independent claims 10, 11, 17, and 18 separately, Appellants rely on the failed arguments for claim 1. (*See* Brief 13, top to 15, top.) Thus, claims 10, 11, 17, and 18, and their respective dependencies (claims 12, 13, 16, 19-24, and 26) fall with claim 1 for the above-stated reasons.

Argument with respect to the rejection of claims 7 to 9, 14 to 15, and 25 under 35 U.S.C. § 103(a) [R2]

Appellants' argue: "The combination of Iyengar and Hiraoka and Chang is legally deficient to support a prima facie case of obviousness against the claimed inventions." (Brief 15, middle)(emphasis omitted).

Appellants make general allegations of patentability that fail to demonstrate the Examiner's error (*id.*). (*See* 37 C.F.R. § 1.111(b).) Accordingly, we find no error.

CONCLUSION OF LAW

Based on the findings of facts and analysis above, we conclude that the Examiner erred in rejecting claims 1-26.

DECISION

The Examiner's rejection of claims 1-26 is Affirmed.

No time period for taking any subsequent action in connection with this appeal may be extended under 37 C.F.R. § 1.136(a)(1)(iv).

AFFIRMED

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